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Educational Outreach Handbook

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OBPR Educational Outreach Program

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Table of Contents

NASA Office of Education Priorities	*3*
OBPR Educational Outreach Policy	*4-15*
Mission Statement	*4*
Guiding Principles	*6*
Definitions	*7-8*
5-Year Vision and Roadmap	*9-10*
Operating Principles	*11*
Program Goals	*12*
Program/Project Plans	*14*
Program/Project Checklist	*15*
Chief, Educational Outreach Responsibilities	*16*
Division E/O Program Mgr Responsibilities	*18-21*
Educational Outreach Organizational Charts	*22-26*

Inspire the next generation of explorers. . .

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NASA Office of Education, Code N, Priorities

If we are to Inspire the Next Generation of Explorers…as only NASA can, we must:

- ***Motivate students to pursue careers in science, mathematics, engineering, and technology***
- ***Provide educators with unique teaching tools and compelling teaching experiences***
- ***Seek to ensure that we are investing the taxpayer's resources wisely***
- ***Engage minority and underrepresented students, educators, and researchers in NASA's education program***

OBPR Educational Outreach Mission

Mission Statement

The OBPR Educational Outreach mission is to communicate the Enterprise's unique space research in order to inspire achievement of academic excellence, to influence choice of science, math and technology careers, and to increase the scientific literacy of our nation's citizenry.

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OBPR Educational Outreach Basics

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Our Foundation

The foundation of OBPR Educational Outreach Programming is solid. Content is reflective of OBPR's Strategic, Fundamental, and Commercial Research. A rigorous review cycle assures the science integrity in all products. Identification of education's 'best practices' through focus groups and research in concert with conducted needs assessments of educators and students give OBPR's educational projects and materials a 'reality check' credibility. Collaborations with notable and respected partners strengthen the ability to offer instructional, practice, and exploration materials and experiences in varied learning styles.

Educational Guiding Principles

It is an accepted fact in academia that nations with higher educational scores tend to have more *inquiry-based, experiential* classroom learning.

The ultimate science educational goal is to enable students to learn with understanding. *Understanding science* involves making connections with real-world people, objects, applications.

Guiding principles of the OBPR Educational Outreach Program will continue to assure bringing to the classroom real-time exchanges, cutting-edge research information, and relevant learning materials.

Listening to, and enabling quality communication among the "experts" is the foundation for the success of OBPR Education Outreach Programs.

This is accomplished by established linkages with our scientific community, OBPR educator networks, collaborations with Educational Professional Associations, networking with the museum/science center community, and support of research that provides a 'pulse' on use of digital learning tools, home schooling, and underrepresented/non-traditional population education needs.

Educational and Public Outreach Program Definitions

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The Office of Biological and Physical Research defines the terms “Educational Outreach” and “Public Outreach” based upon the audiences, intent, and expected outcomes.

Educational Outreach

- Targeted Audiences
  - Learners of all ages
  - Students and Teachers
  - Life-long learners
- Intent
  - To convey a clear, definite instructional message
  - May be one product or a suite of products
  - Connect OBPR research to standards-based curriculum (K-12)
  - Incorporate OBPR research to experiential, non-traditional learning opportunities
  - Engage the learner
- Expected Outcomes
  - Retention of knowledge or ability to ‘teach another” the basic message
  - Increased interest in math, science, engineering, and technology careers

Definitions (continued)

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Public Outreach

- Targeted Audiences
  - An identified specific audience or a general public event
  - General public
  - Specific public associations (i.e. National Space Society)
  - Trade and scientific associations
  - Industry and commercial organization
- Intent
  - To inform, stimulate interest in OBPR research and show relevance to the audience
  - Demonstrate connections between OBPR's research to a scientific or trade community
  - Demonstrate to the public what OBPR research is taking place, why it is taking place, and how it makes a difference in their lives
  - Often a single, stand alone event or publication but there can also be activities to establish ongoing ties such as a newsletter audience
- Expected Outcomes
  - Foster greater public awareness of OBPR programs, goals, achievements
  - Appreciation by the general and specific public audience in how OBPR research has a bearing on their lives.
  - Increase general populace scientific literacy.
  - Initiate interest of individuals or specific audiences to seek additional interaction with OBPR.

5-Year Educational Outreach Vision

Four Target Performance Categories

- Professional Development for Educators
- Experiential Student Learning
- Optimizing Collaborations
- Higher Education

Four Interwoven Themes

- Extending reach to underserved, non-traditional populations
- Integrated technology and digital delivery mechanisms
- Engage learners as participants in space exploration
- Evaluate and benchmark our programs

Four Content Foci

- Biological Sciences
- Physical Sciences
- Commercial Research
- International Space Station/Shuttle Missions/Ground Research

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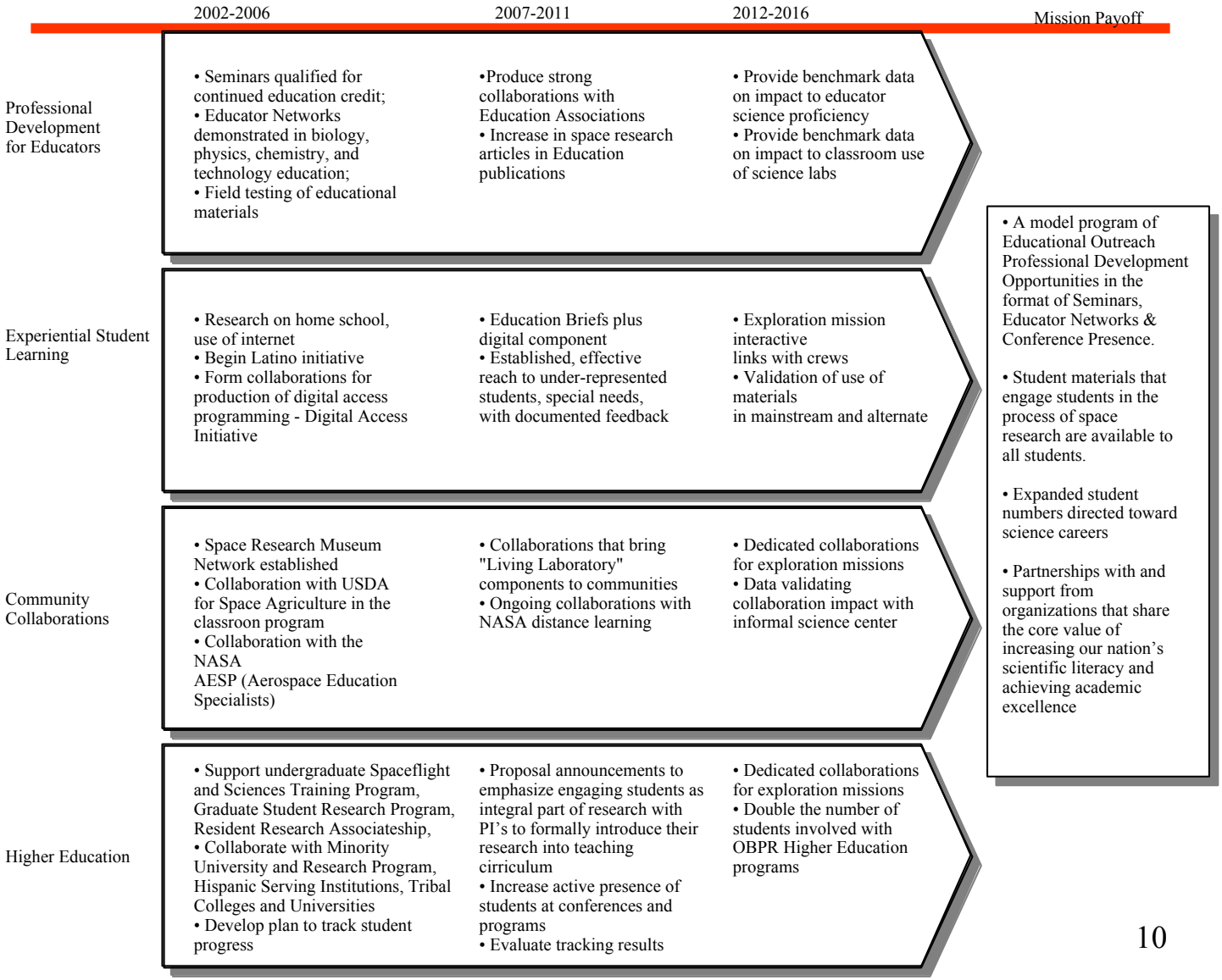
Educational Outreach Roadmap



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Educational & Public Outreach Program Operating Requirements

- Expand the reach and scope of audience participation
  - 10% local & state; 90% regional & national
  - more inclusive of non-traditional populations
  - more inclusive of underrepresented populations
- Establish optimizing, mutually beneficial collaborations
  - across OBPR Divisions and centers
  - within NASA i.e. other Enterprises and Codes
  - external organizations and interested groups
- Explore use of e-media to enhance programs
  - capture interest via use of innovative e-techniques
  - reach new audiences
  - links
  - partnerships i.e. Electronic Field Trips
  - disseminate materials
- Establish a meaningful and practical reporting & assessment process
  - develop an OBPR-wide activity reporting system
  - develop an assessment procedure that identifies the expected outcome(s), an appropriate metric, and actual results
- Establish learning activities directly linked to OBPR research

Educational Outreach Program Goals

- Expand focus on ISS Research
- Develop authentic, experiential classroom activities for grades 6-12; emphasis, 8-12
- Increase breadth of Division science represented in activities
- Inclusion of schematics for educational hardware that simulates a ‘research lab environment”
- Create professional development seminar materials; emphasis high school educators
- Create materials appropriate for potential collaborations with Professional Education Associations
- Increase “Pipeline” efforts

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Summary

- **OBPR's Educational Outreach Program**

- Based upon educational best practices
- Provides 'authentic' learning experiences
- Makes direct links between science concepts, scientists, educators, students
- Recognizes alignment with standards
- Meets Code N criteria
- Contributes to Code N initiatives

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Program and Project Plans Required Information

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- New initiatives or new projects being considered for funding by an E/O Program Manager or as a proposal for funding to OBPR Educational or Public Outreach requires a project plan that includes the following information. If this program includes a flight opportunity and/or an MOU with a commercial organization, additional procedures apply.

  - Project Title
  - Lead E & O Program
  - Collaborative Partners
  - Project's Main Message
    (message should identify subject area)
  - Targeted Audience
  - Expected Scope of Audience
    (Numbers/Geographical Locations)
  - Main Environment of Use
    (conference, classroom, exhibit,etc.)
  - Product(s)
  - Dissemination Mechanisms

  –Product(s)
  (plus coordinated website URL)
  –Dissemination Mechanisms
  (plus planned distribution inventory)
  -Expected Outcome(s)
  - Match with OBPR Research
  - Match with OBPR Educational Goals
  - Match with Code N Priorities
  - Metric(s) to Measure Outcome
  - Required People Resource
    (civil servant and contractor)
  - Phased Funding

Program and Projects Checklist

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This form provides a quick program review. The checklist incorporates Code N priorities as well as OBPR Operating Requirements and Program Goals.

Rating		Code N Priorities	Rating		As Only NASA CAN/ OBPR Vision	Rating		OBPR Educational Goals
Y	N		Y	N		Y	N	
☐	☐	Motivate K-16+	☐	☐	Principal Investigators involved	☐	☐	ISS Research
						☐	☐	Collaborations
☐	☐	Unique Educator Experiences	☐	☐	Connections to Current Research (authentic activities)	☐	☐	Professional Development for Educators
☐	☐	Wise investment of resources	☐	☐	NASA facilities used or referred to	☐	☐	Integrates Digital Technology
						☐	☐	Experiential, Hands-On Activities (Gr 6-12)
☐	☐	Engages Minority, Underrepresented	☐	☐	Educational Hardware	☐	☐	Increases breadth of connections to OBPR research
						☐	☐	Established reporting and assessment process

Chief, Educational Outreach Responsibilities

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OBPR Chief, Educational Outreach

- The incumbent is responsible for the programmatic planning, directions, and oversight of the NASA Office of Biological and Physical Research education program at the national level. The fundamental goal is to establish an integrated Education Strategic Plan and Implementation Policy that will include teacher and student programs, undergraduate and student support, life-long learning opportunities, and public outreach experiences that will focus on OBPR-related disciplines and that will contribute to improved academic scientific excellence and increased public scientific literacy. The incumbent will collaborate and coordinate with OBPR Outreach activities and fully integrate with OBPR scientific, technical, and commercial activities.

Specific Responsibilities

- **Participate** with OBPR Senior Management to develop plans, strategies and policies, assessment for OBPR Educational Outreach Program
- **Develop** OBPR Educational Outreach budget and work with Discipline Divisions to prepare POP guidelines
- **Lead development** of a suite of OBPR educational activities focused on research and missions
- **Oversee implementation** of internal and external OBPR education funded projects
- **Represent** OBPR in domestic and international education and science-related conferences
- **Ensure** that OBPR education programs encompass a broad and diverse national audience and involve minority and underserved populations

Specific Responsibilities
Chief, Educational Outreach (continued)

- **Interface** with the Strategic Enterprises and Functional Offices to ensure the OBPR educational programs are consistent with the NASA Strategic Plan
- **Represent** and advocate OBPR education policies, programs and activities to Offices within NASA Headquarters, NASA Field Centers, OBPR-sponsored researchers, other Federal agencies, educators and the general public
- **Leads,** when required, civil servants, detailees or voluntary staff consultants or contractors to implement OBPR education programs

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Research Division
Education Outreach Program Managers

The following policy sets the expectations of the Division Education/Public Outreach Program Manager, hereinafter referred to as the E/O Manager:

Structure and Communication

- Each OBPR Research Division has an Educational/Public Outreach Program Manager who shall reside in the OBPR Science Directorate at the NASA Field Center of his/her geographical location.
- Headquarters E/O Leadership sets E/O policy with the concurrence of the OBPR Board of Directors.
- The Division E/O Program Managers comprise the E/O Council that interacts with HQ E/O leadership by
  - Providing status updates and requested information related to the Division's E/O programs
  - Participating in policy and program planning meetings
  - Representing the Division at events, conferences, and all communications

Specific Responsibilities

- Represents and coordinates information related to all research and researchers funded by their Division, regardless of geographical location or assignment. That would include but is not limited to a NASA Field Center, an academic institution, an NSCORT, an Institute, or a special center funded by that Division.
- Is to be accessible and responsive to the HQ Division Director, the Center Science Directorate Supervisor, the Headquarters Educational and Public Outreach Leadership, and to all Division E/O personnel

Research Division
E/O Program Managers (continued)

- Develops and coordinates an integrated Division E/O Plan and budget that addresses the OBPR Program Goals and Objectives
    - Utilizes the talents and research of each Division science area
    - Represents the total Division effort
    - Responds to needs specific to the Center and/or Science Directorate
    - Reflects educator and student feedback

- Manages E/O Division program planning and funding to meet the following target goals
    - 90%=national in scope
    - 10%=programs specific to Center and/or the Science Directorate requests
    - Note: E/O dollars received in addition to OBPR funding are to be applied as directed by the funding source.

- Builds collaborations with
    - Other OBPR Divisions
    - Other NASA offices and organizations
    - External partners i.e. professional education associations, other federal agencies, non-profit organizations and corporate entities as appropriate
- Develops and supervises implementation of a communications plan to convey OBPR E/O policy and protocols to all Division E/O personnel and research community.

- Enables OBPR Principal Investigators (PIs) to be involved in the E/O process.
    - Assist with development of PI initiated materials
    - Coordinate PI appearances at E/O workshops or demonstration events
    - Consult upon PI request for E/O guidance/engagement

Research Division
E/O Program Managers (continued)

- Plans for development, production, and distribution of a suite of experiential activities that showcase Division research.
    - Target Goal: 4 per year
    - Target Goal: Build a portfolio that contains a rich balance of Division research
        - Content engages participants in a 'research environment'
        - Content includes background information and appropriate protocols
        - Content includes schematics for 'education hardware'
        - Materials are to be available in print and electronic form
- Coordinates and supervises a Review, Evaluation, and Approval cycle for all E/O materials that includes 'signature approval' from a researcher with expertise in the topic of the material as well as the E/O Program Manager. Signature approval will be kept on file for each activity, fact sheet, web content, etc.
- Plans and implements strategy and budget for Division representation at HQ requested conferences and events.
    - Minimum of 5 p/year
    - Staffing requirements
    - Materials
    - Graphics
    - Shipping
    - Workshops

Research Division
E/O Program Managers (continued)

- Plan and implement strategy and budget for Division E/O support of OBPR-wide programs
  - Space Research Newsletter
  - Space Research Museum Network
  - Science@NASA.gov/Ciencia@NASA.gov
  - Educator Network
  - Shuttle/ISS Mission
  - International Space Station OBPR Downlink (1 p/Expedition)
  - Division-focused educator professional development workshop component
- Ensure that the official OBPR web address is placed on all E/O products and linked on all E/O web pages. SpaceResearch.nasa.gov
- Plan for contribution to the central OBPR image archive (a repository of science-related stills, video clips, etc.)
  - know protocol requirements (See Appendix C for OBPR General Protocols)
  - communicate with/solicit from PIs
  - identify gaps
  - plan for future contributions
- Supervise evolving Division web presence & coordinate links and content presentation with the OBPR website, SpaceResearch.nasa.gov.

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Educational and Public Outreach Organization - Headquarters

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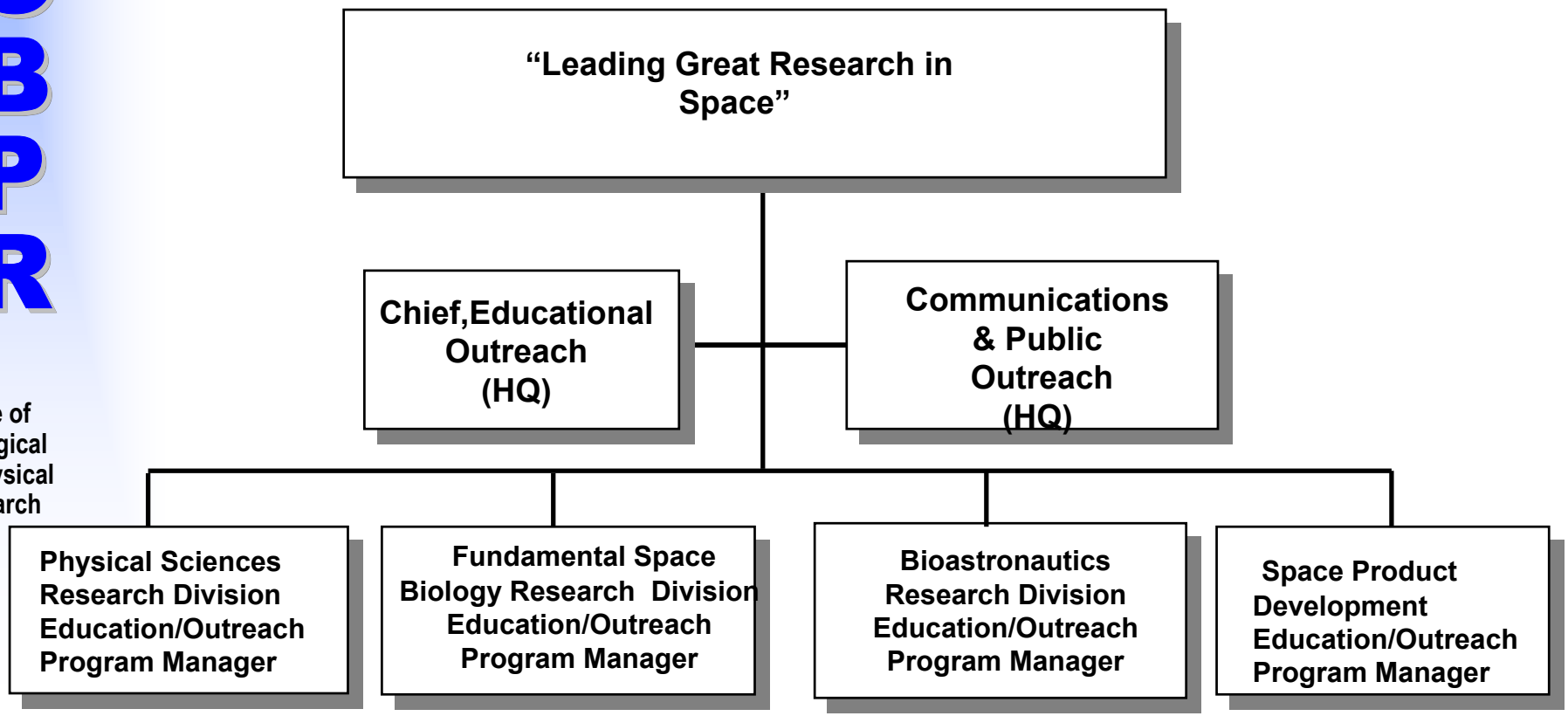
OFFICE OF BIOLOGICAL AND PHYSICAL RESEARCH (Code U)



Fundamental Space Biology Research Division
Education Outreach

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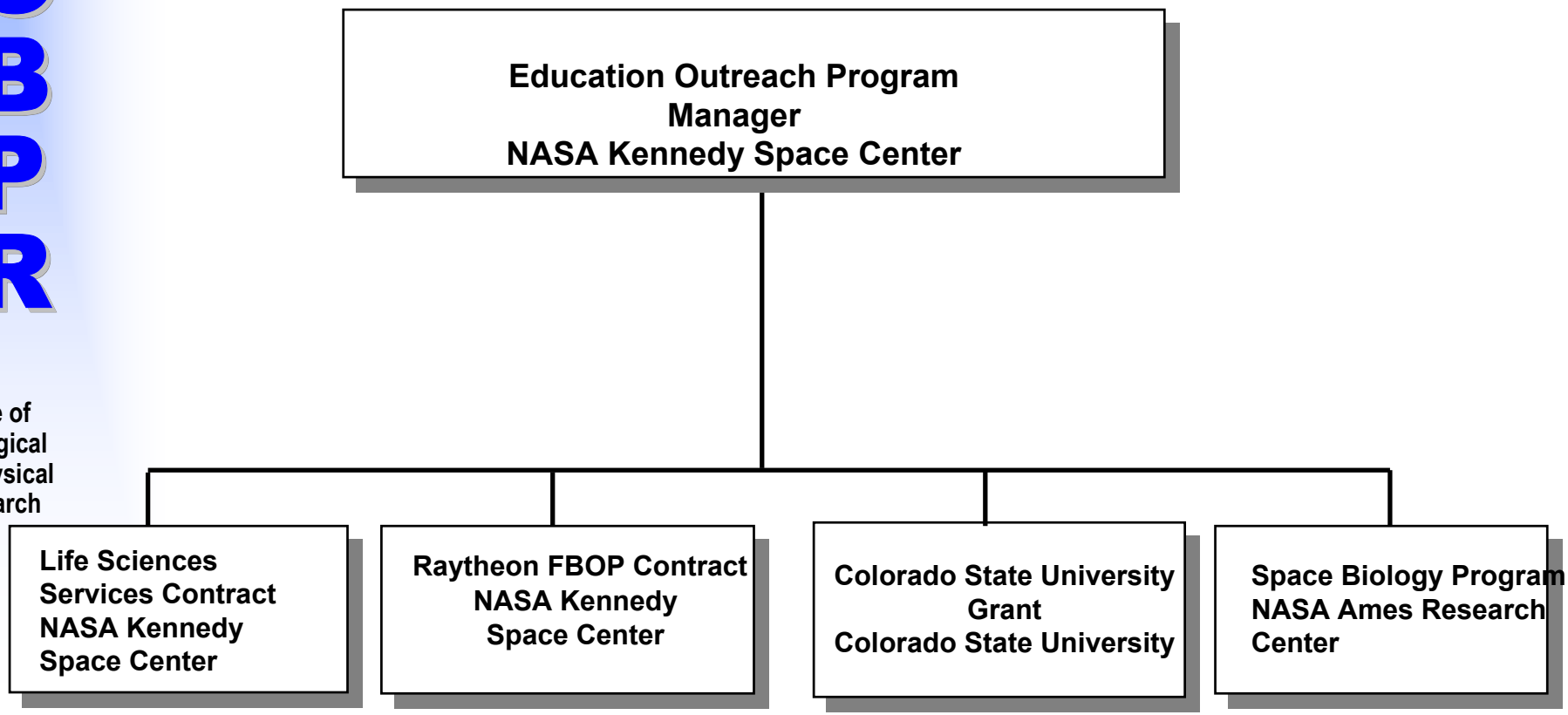
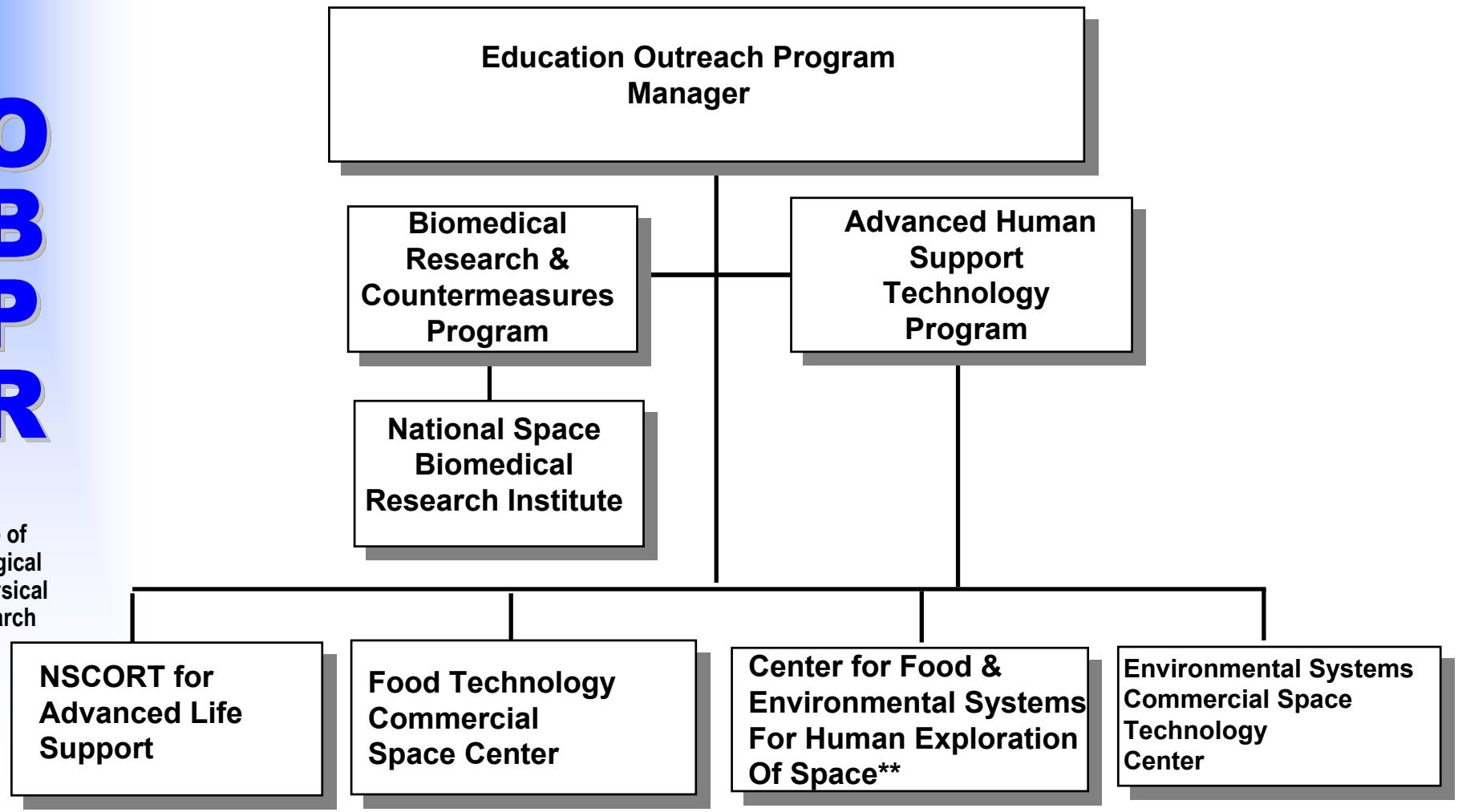


Bioastronautics Research Division
Education Outreach



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Physical Sciences Research Division
Education Outreach

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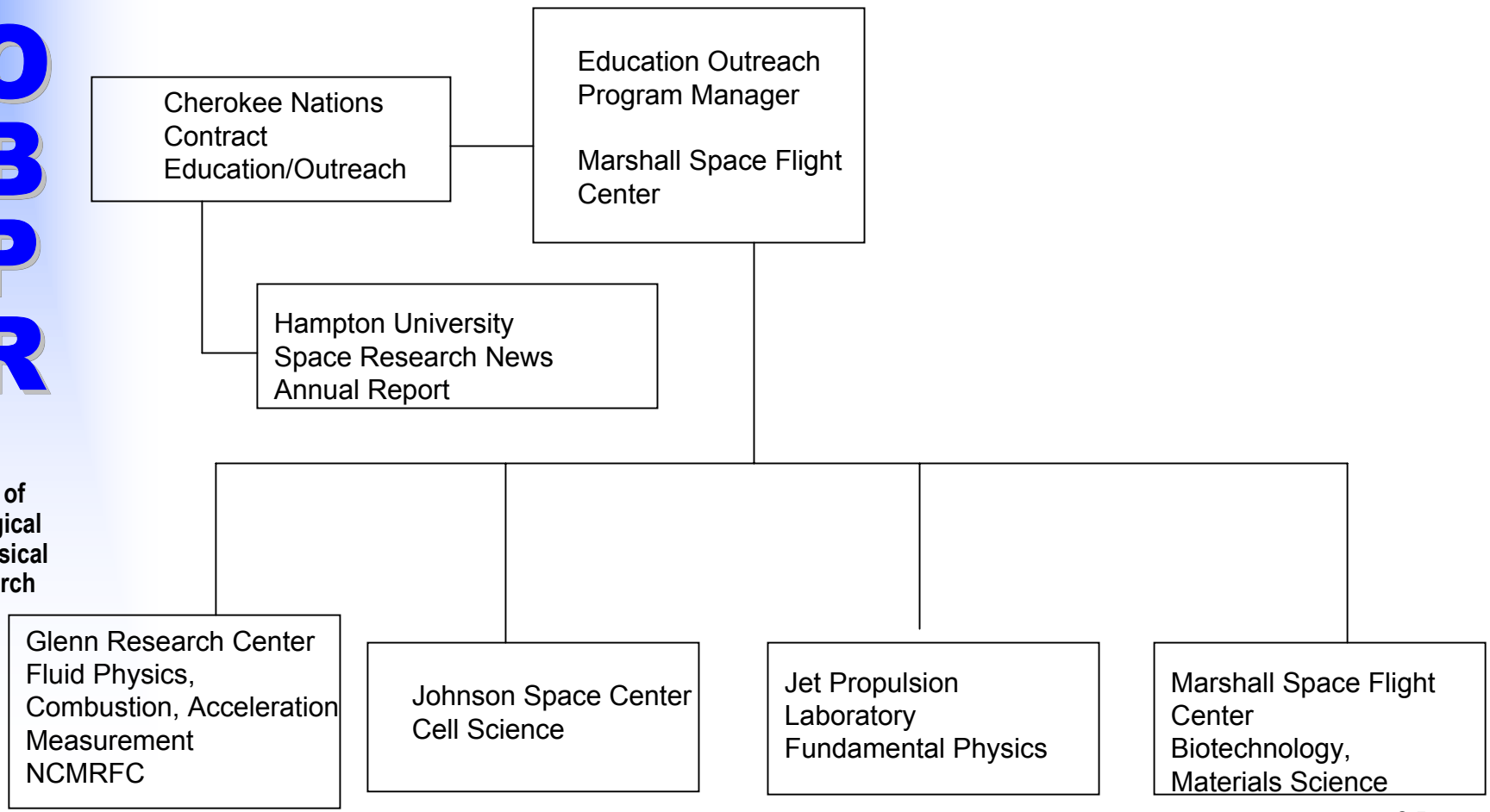

Space Product Development Education Outreach

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SPD Manager

SPD Outreach Coordinators

Commercial Space Centers

BioServe Space Technologies
Center for Advanced Microgravity Materials Processing
Center for Biophysical Sciences and Engineering
Center for Commercial Applications of Combustion in Space
Center for Space Power and Advanced Electronics
Center for Space Power
Commercial Space Center for Engineering
Consortium for Materials Development in Space
Center for Satellite & Hybrid Communications Networks
Environmental Systems Commercial Space Technology Center
Food Technology Commercial Space Center
Medical Informatics & Technology Application Center
ProVision Technologies Commercial Space Center
Solidification Design Center
Imaging Technology Commercial Space Center
Texas center for Superconductivity and Advanced Materials
Wisconsin Center for Space Automation and Robotics

Industrial Partners